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to a less extent, of maples; but the oak, ash, poplar, and pine stand sturdily erect. I believe the leaning of the elastic-fibred elms is due to the prevailing winds, which are from the west and north-west, these winds being also the strongest and coldest. At the office of the U. S. signal-service in Boston, observations are taken three times a day. In 1882, out of 1,095 observations taken, 298 showed the wind to be in the west, and 225 showed it to be in the north-west: in other words, about half (or forty-seven per cent) of the observations showed the wind to be somewhere between west and north-west. For the other five years the record is as follows:—

1877.	1878.	1879.	1880.	1881.
247 W.	229 W.	273 W.	301 W.	278 W.
169 N.W.	231 N.W.	257 N.W.	153 N.W.	175 N.W.

So much for the prevailing direction of the wind. There seems to be no other cause than this, to which we can assign the phenomenon of growth in question. All the many exceptions to the rule are to be explained, doubtless, by local causes, — shelter, neighborhood of other trees, and other more occult conditions of fibre. The works on forestry and botany seem not to notice the fact of asymmetry in tree-growth. It is only a repetition, on a larger scale, of the graceful deviation from monotonous symmetry which characterizes all leaf and branch structure.

W. S. KENNEDY.

Importance of lime-juice in the pemmican for arctic expeditions.

The recent failure to relieve the party under Lieut. A. W. Greeley at Lady Franklin Bay leads us to recur to the repeated difficulties which have marked the history of former arctic expeditions. We have re-examined the accounts of the English expedition of the Alert and the Discovery, under Nares and Stephenson, which left England, May 29, 1875. It was the first English arctic expedition which had orders to endeavor to reach the North Pole. It had the advantage of the advice of experienced arctic navigators, its commander Nares having been a member of several such expeditions.

Thus it surprises the reader, that more thorough precautions were not made against the scurvy. The *London quarterly review* for January, 1877, has the fullest account of the ravages committed by that disease with the sledge-parties sent out by Nares. Of the sledge-party under Commander Parr it says,—

"Of seventeen of the finest men of the navy, who composed the original party, but five were (on return) able to walk alongside. One was dead, and the remainder in the last extremity of illness."

It gives a minute account of the prostration by scurvy of the two other sledge-parties,—one under Commander Beaumont, and one under Commander Aldrich. Concerning the latter, the *Review* says,—

"To quote from the journal of Commander Aldrich, who led the western division, would be to repeat the same dreadful details. The party broke down, and were supported by the same pluck, and brought back alive—that is all one can say—by the help of God and the same determined courage. Surely, nothing finer was ever recorded than this advance of three sledges,—one to the north, another to the east, a third to the west,—laden down with sick and dying men, in obedience to an order to do their best, each in their separate direction. It is the old story,—too common in English annals,—the organization broke down, and individual heroism stepped in to save the honor of the day. But at what a cost!"

All this was because the parties had no lime-juice. And Capt. Nares, "with a chivalry and candor which do him honor, whether he has failed in judgment or not, declared that such was the fact, and that the omission was made by his orders and on his responsibility." He said,—

"Acting on my lights and experience at the time, I followed the example of such men as M'Clintock, Richards, Michan, and McClure, of the Investigator, and started off our sledges with as nearly as possible the same rations as had proved fairly successful on all previous occasions; that is, without lime-juice for issue as a ration, a small quantity for use as a medicine being carried by the sledges, which were not expected to be able to obtain game. . . . Up to the middle of May the lime-juice remains as solid as a rock. No sledge-party employed in the arctic regions in the cold month of April has ever been able to issue a regular ration of lime-juice. In addition to the extra weight to be dragged, that its carriage would entail, there is the even more serious consideration of the time necessary in order to melt sufficient snow."

He added,—

"Of course, hereafter, lime-juice in some shape or other must be carried in all sledging journeys; and we earnestly trust that some means will be found to make it in a lozenge, for, as a fluid, there is, and will always be, extreme difficulty in using it in cold weather, unless arctic travelling is considerably curtailed."

The *Quarterly review*, in quoting these manly remarks of Capt. Nares at Guildhall, says,—

"Even if it should be found that Sir George failed in judgment in this matter, he has in our opinion shown the finer form of fitness for command, in his readiness to assume the responsibility of his acts."

His frankness and manliness in assuming the whole blame to himself have evidently, in great measure, disarmed criticism.

But this brings us to the main object in this letter; and that is, to recur to the remedies which this story has suggested. If lozenges of lime-juice in a shape for arctic exploration have not been manufactured, they certainly can at least now be found at the druggists in a shape to be used as troches for colds.

But the efficient remedy is to have pemmican made which is permeated with lime-juice, as recommended in the 'Report of the surgeon-general of the navy for 1880' (see p. 356). Gen. P. S. Wales said,—

"The indispensable necessity of lime-juice in the sledging-parties, and the difficulties of carrying it, and preparing it for use, induced me to suggest the propriety of combining the juice and pemmican in the proportion of one ounce to the pound of the latter. The pemmican is greatly improved in taste and flavor, and will, I believe, be more assimilable. This is an important modification, as there are persons who cannot eat the ordinary article."

The article was prepared as proposed, and tried in Washington, and pronounced to be very palatable.

Gen. George H. Thomas, in preparing for one of his battles, issued a general order, enjoining upon his whole army strict attention to minutiae, saying that "the loss of a battle might be due to one missing linchpin."

In recurring to this recommendation from the office of the surgeon-general of the navy, we have thought that it may be considered opportune, when the minds of many are now turned upon the arctic expeditions. We think that recommendation was followed, so far as the preparations of the Jeannette and the Rodgers were concerned; but, alas! they never got so far as to turn their attention to fitting out explorations with sledge-parties.

BENJAMIN ALVORD.

Rensselaeria from the Hamilton group of Pennsylvania.

Will you kindly afford me a small space to correct an error in your report of the discussion which followed the reading of my paper at Minneapolis? On p. 327 of your issue for Sept. 7 occur the following sentences:—

"The differences between them [the fossils exhibited and the Oriskany species of *Rensselaeria*] were slight, though well marked. Professor Hall described some of these differences, and Mr. Claypole acknowledged that a certain V-shaped groove was wanting in his specimens. Professor Hall thought that possibly the fossils should be referred to *Amphigenia*, which had many similarities to *Rensselaeria*."

The V-shaped groove in question is one of the generic marks of *Amphigenia*; and its absence, therefore, was urged by me as excluding the fossils from that genus, and inferentially as a strong argument in favor of placing them in *Rensselaeria*.

As the above-mentioned error places me (and I think Professor Hall also) in false positions, and involves a grave mistake in paleontology, I am induced to ask your insertion of this correction, which I have submitted to Professor Hall for his approval.

I ought to add that the suggestion of *Amphigenia* by Professor Hall was only the result of a momentary impression on the first sight of the fossil, and one which he immediately withdrew, on observing the absence of the V-shaped groove above alluded to.

E. W. CLAYPOLE.

Aurora.

The auroral display here to-night was unusually brilliant. I observed it first at 7.04 P.M. At this time a low but rather brilliant arch of light spanned the north-eastern horizon, the crest of the arch having an altitude of about 20°. During the next three minutes, the lights rapidly took on the 'streamer' form, gradually shooting upward to a little beyond the zenith, and at this time stretching from east, 10° south, around to west, 15° north, on the horizon. During about two minutes, the waving-curtain aspect was very pronounced in the north-east, after which only striated patches flamed out here and there, moving alternately west and east. These patches all converged toward the zenith, but left with one the impression of being pendulous and very near. The atmosphere appeared very clear, the moon full and bright, the twilight still strong; and there was light enough yet to enable one to read a newspaper, but with difficulty. The streamers, however, lay in sharp contrast against the blue sky, even where the twilight was strongest.

At 7.15 the lights began to die rapidly away, and at 7.50 none were to be seen; but at 8, and again at 8.13, there were distinct but small curtains to be seen in the north-west. At 8.20 there began a magnificent display. Three large curtains formed one above the other, the lowest about 20° above the horizon in the north-west. They drifted gently toward the zenith, swaying and folding just enough, it seemed, to suit the almost imperceptible breeze which was stirring. The lights could be easily seen within 7° of the moon; and yet it cast its shadow on the carpet in a room 13 by 14, where two kerosene-lamps were burning, one of them a no. 1, and the other a no. 2, burner. At 9.10 scarcely a trace of the aurora could be seen. A little later, a very faint diffuse light covered the northern sky to an altitude of about 25°. This soon became striped, and afterwards appeared to move bodily toward the zenith. At 10.20 the lower sky had become a deep blue; and just above it, at an altitude of 30°, a broad arch of bright but uniform light formed across the sky; and above this, extending past the zenith, were similar but much fainter bands. Five minutes later, the bright band unfolded a curtain which dropped in exquisite folds toward the horizon. This lasted less than two minutes, the whole belt of light becoming striated, but leaving a clear space next

to the horizon; then followed about five minutes during which the illuminated portion of the sky seemed to be throbbing, and sending out waves of subdued light, which spread southward over the blue vault, dying away before the zenith was reached. This movement soon became more violent; and between 10.40 and 10.45 the lights had more the appearance of flames bursting rapidly from the sky, and spreading to the zenith, where they often turned abruptly toward each other, and met. This appearance continued growing gradually less marked until 12.15 A.M., when there was scarcely a trace of auroral display. At 12.40 a faint arch of diffuse light could be seen in the north, like that already described.

F. H. KING.

River Falls, Wis., Sept. 16, 1883.

THOMPSON'S PHILIPP REIS.

Philipp Reis: inventor of the telephone. A biographical sketch, with documentary testimony, translations of the original papers of the inventor, and contemporary publications. By SYLVANUS P. THOMPSON, B.A., D.Sc., professor of experimental physics in University college, Bristol. London, E. & F. N. Spon, 1883. 9+182 p., 3 pl. 16°.

THE rapid development of the literature of the telephone, and the wide-spread interest in matters relating to it, have rendered the most important details of its history familiar to the general reading public, as well as to the scientific world. The account of the life and labors of Philipp Reis, by Prof. S. P. Thompson, while repeating many of these well-known details, contains some interesting notices of the life and personal characteristics of the inventor, and of the various steps by which he brought his instruments to their final stage. Following the brief biographical sketch, are descriptions of the various forms of apparatus devised by Reis, with numerous illustrations; a statement of what the author terms the inventor's claim; copies of Reis's own publications respecting his invention, and of certain contemporary accounts of it and its operation; with the testimony of persons who witnessed his experiments. An appendix discusses the variable resistance of imperfect contacts, a comparison of Reis's receiver with later instruments, the doctrine of undulatory currents, with some additional notes and references relating to Reis's invention.

Had the efforts of the author been directed to the presentation of these things as matters of history merely, the book might be regarded as a valuable and interesting summary of facts relating to an important invention, and would demand but a brief notice here; but a cursory examination of it is sufficient to show that the author has failed to maintain that judicial attitude of mind which is indispensable to the just